

Team 3 (AKA “Team 13”) Checkpoint Plan
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Checkpoint #1 (5/10/16)

Deliverables:

- 1) Demonstrate a platform that is able to hover with the lift fan and at least three NiCad batteries loaded on it. The lift fan must be driven with the appropriate voltage (~12 V) which can be sourced from a power supply. Platform must be able to move forward and turn using propeller fans under the control of on-board hardware switches or an on-board microcontroller. Electronic hardware can be in a breadboard.
- 2) 2 Microcontrollers (one PIC16F1788 and one TIVA) communicating using two XBees via async communications on breadboards.

Test plan:

For deliverable #1:

- 1.1 Place platform on the floor with the required batteries and associated circuitry.
- 1.2 Flip the switch (in hardware and/or software) to enable the lift fan.
 - The fan should start running and the platform rise up and float on skirt.
- 1.3 Flip switches (in hardware and/or software) to enable the two propeller fans.
 - The platform should move forward for at least 1 meter.
- 1.4 Enable one propeller fan and then the other propeller fan.
 - The platform should turn one direction and then the other.

For deliverable #2:

- 2.1 Power up the two communications circuits with the appropriate code loaded into the microcontrollers.
- 2.2 Via a keystroke (L) input into the TIVA processor, send a message over XBee to the PIC processor on the other end to turn on an LED.
 - An LED connected to the PIC processor should light up.
- 2.3 Via a keystroke (J) input into the TIVA processor, send a message over XBee to the PIC processor to turn off the LED.
 - The LED connected to the PIC processor should turn off.

Checkpoint #2 (5/16/16)

Deliverables:

- 1) The mechanical design of the hover platform must be at its final stage. This includes a working and final skirt design, a platform with electronic mounts, propelling fans mounts, a sturdy mount for the lift fan and electronics soldered on proto-board.
- 2) Complete the DMC with the flag mechanism to show pairing status and team selection. DMC must be mounted on the LOBBYIST. Enable communication to the PIC12F752 through UART.
- 3) Implement the class wireless communication protocol with pairing and encryption.
- 4) Have the PAC controlling the lobbyist with our proposed sensing modalities. Also, have indicators showing pairing status. Electronics will be on breadboards.

Test plan:

For deliverable #1:

- 1.1 Show new LOBBYIST design and please your eyes.
 - 1.2 Perform testing procedures specified in Checkpoint #1 deliverable 1.
- The LOBBYIST successfully completes Checkpoint #1 deliverable 1

For deliverable #2:

- 2.1 Show DMC mounted on the hovering platform.
 - 2.2 Show that the DMC is only receiving commands through a single wire via UART communication.
 - 2.3 Choose a team and a target pairing LOBBYIST. Shake the accelerometer to initiate pairing.
- The flag raises when successful pairing happens and indicates the selected team with an LED.

For deliverable #3:

- 3.1 Pair with the LOBBYIST.
- LOBBYIST Pair LED indicator lit up
- 3.2 Connect the logic analyzer to the TX line of the PAC.
 - 3.3 Send a turn on LED command to the LOBBYIST.
- Second LED turns on on command.
- 3.4 See with the logic analyzer the encrypted message sent and remember the pattern.
 - 3.5 Send a turn off LED command.
 - 3.6 Send a turn on LED command again.
- The Signal captured by the Logic analyzer this time is different from the first one showing that encryption is happening.

For deliverable #4:

4.1 Lean accelerometer forwards, then backwards, and then in between (with the active axis pointing straight up).

LOBBYIST must propel itself forwards, then backwards, then stop its drive motors.

4.2 Twist the potentiometer right and then left (while leaning accelerometer forward).

LOBBYIST must turn right and then turn left while moving forwards.

4.3 Select correct position on our 4-way bot-selector switch. Select either team color on our two-way switch. Pair with LOBBYIST.

LOBBYIST and PAC must indicate successful pairing with correct team color. Lobbyist must raise a flag and turn on red or blue LED. PAC must indicate team color with either an LED or LCD display.

Project Preview (5/19/16)

Deliverables:

- 1) Fully finished electro-mechanical design of the PAC.
- 2) The PAC must now be able to control the LOBBYIST with the thematic props.

Test plan:

For deliverable #1:

- 1.1 All circuitry on PAC must be soldered and insulated.
- 1.2 Steering wheel must be mechanically coupled to the potentiometer in a robust manner.
 - Steer the wheel and it should remain stable and undamaged.
- 1.3 Hook hand must be tethered securely to the PAC.
 - Move the hook hand around and ensure that none of the connections fall out.
- 1.4 The panel containing the PAC must be fully portable and contained.

For deliverable #2:

- 2.1 Steering wheel must control direction.
 - Steer the wheel right and left and observe the PWM difference in the LOBBYIST'S drive propellers.
- 2.2 Hook hand must control speed of LOBBYIST.
 - Point the hook hand forward and observe the LOBBYIST speed up (and vice-versa).
- 2.3 Shake the hook hand to pair.
 - Shake the hook hand with the appropriate team color chosen by a switch on the PAC. Lobbyist must raise the flag and show appropriate LED color.